



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**B.A.DEGREE EXAMINATION – ECONOMICS**

**FIFTHSEMESTER – APRIL 2018**

**EC 5404- MATHEMATICS FOR ECONOMISTS**

Date: 10-05-2018  
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

**PART A**

Answer any **FIVE** of the following questions:-

[ 5x4=20 marks]

1. Distinguish between ‘simple differentiation’ and ‘partial differentiation’.
2. Define ‘Left Side Limit’ and ‘Right Side Limit’.
3. What is the condition for a point of inflexion?
4. State the conditions for relative maxima and minima of  $Z = f(x,y)$ .
5. Find  $\frac{\partial z}{\partial x}$ ,  $\frac{\partial z}{\partial y}$ ,  $\frac{\partial^2 z}{\partial x^2}$ ,  $\frac{\partial^2 z}{\partial y^2}$  and  $\frac{\partial^2 z}{\partial x \partial y}$  from  $Z = 6x^2 + 3xy - y^3$ .
6. Distinguish between definite and indefinite integrals using suitable examples.
7. Evaluate  $\int x\sqrt{2x^2 + 1} dx$ .

**PART B**

Answer any **FOUR** of the following questions:-

[4X10=40 marks]

8. State the rules of differentiation with suitable examples.
9. Illustrate the various types of functions.
10. Explain the conditions for relative maxima, minima and saddle point for the function  $Z = f(x, y)$ .
11. Derive  $MR = AR (1 + \frac{1}{ed})$ .
12. Show that Average cost and Marginal cost intersect at the lowest point of the Average cost function.
13. State and prove Euler’s Theorem.
14. Find the extreme values (if any) of the function  $Z(x, y) = 3x^3 - 5y^2 - 225x + 70y + 23$ .

**PART C**

Answer any **TWO** of the following questions:-

[ 2X20=40 marks]

15. Examine the role of differentiation and integration in economic analysis.
16. A company has the following demand and cost function for a particular item, Demand function is  $P + 2Q^2 - 600 = 0$ , cost function is  $TC = 216Q - 100$ .
  - a. Determine the price and output for maximum sales revenue and calculate maximum revenue.
  - b. Determine the price and output for maximum profit and calculate the maximum profit.
17. The quantity demanded and the corresponding price under pure competition are determined by the demand and supply functions  $P = 36 - q^2$  and  $P = 6 + \frac{q^2}{4}$  respectively. Determine the corresponding Consumers’ surplus and Producers’ surplus.
18. A consumer has the utility function given by:  $U = 5 \log x_1 + 3 \log x_2$ . If the budget constraint is given by  $10x_1 + 14x_2 = 124$ . Find the optimum quantities of the two goods that the consumers should purchase in order to maximize the utility subject to the budget constraint.

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